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Comics Jam: Creating healthcare and science communication comics – A sprint co-design methodology

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Educational and public information messages can be enlivened through the medium of comics, engaging readers not simply through the content, but through careful application of the attributes of the form. The creative and oftentimes collaborative processes used to create such comics benefit from the blending of different perspectives and expertise in order to ensure that the educational message is precisely calibrated. This article elucidates this argument in light of a suite of educational and public information comics produced by the authors as part of a multidisciplinary team from the Scottish Centre for Comics Studies (SCCS) at the University of Dundee, working with various external partners, and reflects on the methodological and pedagogical approaches embedded in this project. We argue that by using a participatory and iterative process that draws on some of the key elements of Jake Knapp's concept of the design sprint, a prototype comic can be quickly developed that is informed by relevant scholarship and engages a diverse range of partners as co-designers, which can then be moved quickly to the final version. This process creates a feedback loop between research, practice and the various stakeholders, each of whom is empowered within the co-design methodology to contribute to the comic based on their expertise. This is driven by the operational logic of such projects, which bring together participants from diverse backgrounds and areas of expertise, to collaborate and co-design outputs at the interface between critical and creative investigation. In many cases, the comics that we have produced have been to a tight deadline, where the need for the comic is pressing, so the process partly emerged due to necessity, but became refined over the course of several years, evolving into a practice research approach combined with a sprint co-design methodology that embeds learning outcomes in the process as well at the output. Given the nature of this process, we took to describing this activity as a 'Comics Jam', and due to the city's association with the three J's of Jute, Jam and Journalism, the name sort of […] stuck.

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There is a small body of academic work specifically on educational and information comics, but a rapidly growing corpus of work on the uses of comics for educational purposes. Associated with this are a growing number of research projects and networks where comics are created for educational purposes. Graphic Medicine and Graphic Justice are examples of this, as is the Applied Comics Network run by Ian Horton, John Swogger and Lydia Wysocki, which organizes events and projects to promote the use and study of applied comics (appliedcomicsnetwork.wordpress.com/). The Applied Comics Etc. group, established by Wysocki, is also dedicated to the educational uses of comics (appliedcomicsetc.com). This was founded by Lydia Wysocki in Newcastle upon Tyne, and grew out of her research on the educational uses of comics. The projects undertaken by the group include working with various partner organizations, including Seven Stories: The National Centre for Children's Books and the Great North Children's Hospital. They also frequently involve children and working with groups in the community, an approach shared by the Scottish Centre for Comics Studies (SCCS). The comics team at the University of Dundee (UoD) have a diverse range of research interests, many of which have converged on the theme of Public Information and Education Comics over the last several years (Murray 2019). Within this project, there is an emphasis on healthcare and science communication comics, as well as several others that have sought to present information and instruction on topics relevant to the local community (an example being a comic explaining the workings of participatory budgeting that was commissioned by the city council). The infrastructure that supports this work is managed by SCCS, which runs Dundee Comics Creative Space (DCCS), a social enterprise project that is co-funded by the School of Humanities and the Rank Foundation, and has attracted external research funding (Figure 1). DCCS holds two weekly after school clubs for young people aged 10–17, runs many workshops in the community and is the home of Ink Pot Studio, a space for local comics creators. The artists based in Ink Pot help facilitate the comics clubs, and, as well as working on their own projects, are commissioned to help co-develop projects with the comics team, often with an external partner. This supports the practice research in Comics Studies, and the fact that comics artists are paid to do this work also helps sustain comics as a creative economy in the city. The outputs are published through UniVerse, the University's

comics publishing imprint, and are available online for free as downloadable electronic versions. Most are also available in print and distributed for free at launch events, conventions and through other public engagement activities.

The research interests of the comics team have fed into the development of the Public Information and Education Comics project. In researching the use of comics for the purposes of propaganda and public information communication during wartime, Christopher Murray found that superhero comics were able to underscore these messages through the associations of the genre with patriotism and heroism, and presented persuasive and informational messages using the levers of entertainment (Murray 2011. He has written several comics to explore his research findings through creative means, working with a range of artists in Ink Pot. Similarly, Megan Sinclair's research on 'Superhero Healthcare' has demonstrated that the superhero genre's key theme of resilience can be usefully employed in healthcare comics that use the figure of the superhero to inspire readers. Sinclair also produced an autobiographical comic about her father's sudden death from heart disease in partnership with the British Heart Foundation (Sinclair et al. 2018). Golnar Nabizadeh's research on trauma in comics also explores autobiographical comics, with an emphasis on those that represent the experiences of oppressed or marginalized people (Nabizadeh 2019). She has lead on a project about explaining death and grief to young people and worked with a number of bereaved children on the production of this educational resource in comics form. The work by Murray, Sinclair and Nabizadeh (all based in the School of Humanities) supports the finding of Heike Elisabeth Jungst, who argues in *Information Comics: Knowledge Transfer in a Popular Format* (2010) that the success of information and educational comics partly resides in the fact that they often borrow narrative conventions, visual style and other associations from what she calls 'donor genres', placing the information being presented in the context of entertainment and fantasy that the readers are already primed to be receptive towards. Divya Jindal-Snape, who researches life transitions, including health and educational transitions, has applied her work to the representation of healthcare challenges through a series of comics, and most notably one on fibromyalgia, for which she created an autobiographical story. The comic also features stories based on

the lived experiences of others with a number of artists contributing. Mayra Crowe, who teaches Spanish, has helped develop several public information comics, and led on the creation of a comic drawing on her experience of being an advocate for organ donation following the sudden death of her teenage son. This was produced with assistance from the NHS. Damon Herd, formerly the coordinator of DCCS and now a lecturer in communication design at Duncan of Jordanstone College of Art & Design (DJCAD), has supervised and contributed to several public information comics. He co-runs a Medicine and Literature Self Selected Component module for the School of Medicine at the UoD, which examines 'Graphic Medicine' comics. He has also created an autobiographical comic, *The Adventures of Ticking Boy* (2011) that touches on aspects of healthcare. Phillip Vaughan, who lectures on comics and animation at DJCAD, has worked on a project on comics and dementia, and has overseen all of the comics published by UniVerse in his role of art director for SCCS. Key to these projects is the ability to work closely with a range of comics creators based in Ink Pot Studio, and to commission them to make comics based on research and public engagement activities. This has created a feedback loop between researchers and artists that has resulted in the further embedding of practice research within the Comics Studies team. This infrastructure and network facilitate the development of projects where both creative and critical modes of investigation meet through a process of collaboration, partnership and co-creation that we refer to as a Comics Jam.

'Comics Jam' – The Dundee co-design sprint process

The Comics Jam embeds learning at the heart of the process by bringing together a range of partners to share their expertise and experience in a participatory and iterative process (Figure 2). This is enabled by the structures in SCCS and DCCS. The partners are typically charities, various public institutions, schools, professionals, local government and the private sector, as well as children/young people and families, members of the public and other academics. Many of the partners we work with have no prior experience with comics, and the specific problems and challenges they are trying to address are often novel to us, so the work is very much a mutual learning experience for all involved.

While the particular capabilities and strengths of the comics medium are of course very well understood by the comics team and the comics creators that we work with, potential partners often need to develop an understanding of how comics can engage readers in a number of unique ways. Firstly, there is the power of the medium to communicate information through words, image and narrative, which work together to challenge readers to find meaning. Secondly, comics can have a powerful effect on readers who do not expect the medium to communicate such messages. This can have the effect of disarming readers and challenging their expectations (disrupting their sense of what comics are and can do). This is crucial, as the process is not merely one of commissioning. The partners usually come to us with a sense that they have a message they want to communicate and that are curious to know what can be done with a comic. In some cases, it transpires that a comic is not the right way to communicate their message. In some instances, the partners have been looking for us to provide artwork for what are essentially pamphlets or posters. A comic is not always the solution. But in most cases, and in the examples we discuss here, the result has been a comic.

A typical Comics Jam will start with a meeting between the partners to workshop and agree on the project's aims, target audience and to start shaping the message through a brief. The first thing to establish is what form the output will take. Sometimes the comic is the only output, and in some cases, there are others, and the comic is one part of a wider strategy. Once we have defined the output and gone through several iterations of this in quick succession, we produce a prototype treatment. Prospective artists are usually involved at this stage, as well as the individual tasked with running production on the project (which involves taking responsibility for the design and making the comic print ready). The team works with these prototypes in order to make key decisions about which model is most appropriate for the story being told, asking questions about tone, perspective and the specific nature of the information or educational messages. There are also key decisions to be made about form. Whether this is a short comics strip or a 40-page comic. Whether the output will be a digital comic or a printed book, or both. There are many decisions to be taken about the format and layout. None of these is determined at the start but emerges through a process of discussion. Once these aspects are agreed in a group meeting, we then move to a group scripting process, where all ideas are

entertained and all members of the project team collaborate to refine the idea and present it in a way that serves the need of the client or partner, but also give information in a way that is comprehensible to the artist. At this point, depending on the nature of the project, a range of individuals, some from the partner organizations and some members of the public, will be engaged in helping to produce stories that the comics teams turn into the scripts. Many of the partners and members of the public we work with have no experience writing comics scripts, so we work closely through numerous versions of the treatment and script, ensuring the correct message is being communicated, then we move quickly to the thumbnailing stage, where the partners and collaborators can advise on whether the visual interpretation of the story is correct. Details are often important here. In one story, an artist drew prescription drugs being left in the room of a patient by a nurse and the medical professional quickly pointed out that this would be a disciplinary matter under the circumstances described in the story. This was not an aspect of the story we were telling, but the artist's innocent extrapolation of the script produced unintended meaning that only the expertise of the medical professional was able to catch. This is why a number of touchpoints between all the partners in the process are so crucial, and demonstrate the knowledge exchange between the partners. What separates this process from a standard commission is that the learning works both ways. The partners learn about the potential of comics, but they are also learning how to communicate their message in different ways. Each project has taught us more about the priorities and concerns of clients, and how to shape these messages for a diverse range of audiences. From this point, the artist will move quickly towards the final version. A final scrutiny stage ensures that the key messages and details are correct. Once the final drawn version is signed off, the comic moves to the publication stage, and we plan a launch and implement a media strategy in conjunction with the partners. We gather information on numbers of copies distributed or downloaded, and use questionnaires to evaluate the effectiveness and impact of the work. We also maintain contact with the partners to gather information about impact at certain key points subsequent to the launch of the comics as a way of gathering further information on impact. The advantage of this process is that it allows for the relatively rapid process of creation that engages all stakeholders in the co-design process, embedding specialist knowledge and impactful

messages in the comics in an effective and targeted way, while mobilizing the talent and experience of the creators to help problem-solve.

The Comics Jam has become an important methodological tool as it is empowering and gives a sense of agency to those with different expertise and perspectives (the comics team, the partners, the artists, the participants and the public), promotes innovation and makes the message more targeted and the end product more relatable to the audience, leading to better social and educational impact (Dietrich et al. 2016). It also allows for feedback in ways that reduce the risk of misrepresenting the experience of those whose stories we are telling, or of introducing factual errors that might emerge in the creative process. This method was developed over time, via trial and error, and some of the key ideas were developed in response to Knapp's work, but it is important to note that our process is not a straightforward application of the sprint design process as described by Knapp. Rather, we developed our own ways of working, then reflected upon and refined them with the design sprint methodology in mind. We do not workshop over a five-day period, as specified in Knapp's process, and the structure of our method is not identical to Knapp's, especially since, as noted above, while comics are not the only possible outputs, it is somewhat predetermined that a comic of some shape and form will be the solution we arrive at, but we do respond to the core insight of Knapp's process – the importance of moving quickly from a point where all ideas are on the table to workshopping a few ideas in order to test them, identifying the priorities, then finding the optimal way forward via the development of a prototype, all the while interrogating the idea to find its strengths and weaknesses. This feedback loop has led to knowledge exchange for the partners, the public and the professionals, such as with the prescription drugs in the comic noted above. The comics artists developed skills and expertise that has led to further projects and commissions, and a spin-off public information comic project, Chip Collective, started by two comics creators based in Ink Pot who have worked with the team on a number of our public information comics. The most common outcome of this process is that the key question or issue that needs to be put to the public is more refined and focused by the end. Comics communicate information in a very economical way, and the artists need to be able to condense a lot of meaning into a small space, and

the co-design process makes this feasible, giving them direct access to the expertise of the partners. This is not novel in itself, and this process is certainly one that can be replicated elsewhere, but it is also one that is facilitated in a very particular way by the infrastructure of SCCS and DCCS, not simply through the physical space in DCCS, the artists who are supported through Ink Pot Studio and the in-house print unit, but also through the support mechanisms that are in place at the UoD to support practice research and partnership-based working. This infrastructure, developed over the last five years, has allowed us to move from being a platform that supports certain types of creative working to a pipeline for collaborative, interdisciplinary practice research and public engagement activities. The remainder of this article will outline the operation of this methodology with reference to two aspects of the public information comics project – healthcare and science communication comics.

Healthcare comics

When the SCCS launched DCCS in 2015, it was with the aim of working with the community and various partner groups, including charities. This partly grew out of the fact that the co-funder of DCCS was the Rank Foundation, a charity that had recently invested in a number of charities in the city. One of the first projects undertaken by DCCS was the creation of a comic in partnership with another Rank-funded project, Advocating Together, a charity that exists to defend and safeguard the rights of people with learning disabilities, autistic spectrum disorders and/or complex communication needs through independent advocacy. The theme of the comic was a pressing and emotive issue – disability hate crime. Advocating Together's service users (known as Advocators) and staff worked with the DCCS team and a number of comics artists to produce the comic, which revealed the extent to which disabled people suffer prejudice and assault, both verbal and physical, in the course of their daily lives. These cruelties constitute hate crimes, but are not always thought of in those terms. The comic, published in 2016, offered a powerful means to visualize these experiences and proved to be a valuable resource to the group. The process of creating the comic began with a meeting with Advocating Together to set the brief for the project. The charity was about to launch

the Dundee Safe Place Initiative as part of Police Scotland's Keep Safe Scotland campaign. This project worked with businesses and organizations to provide safe spaces for the disabled community when they did not feel safe when travelling independently. Advocating Together wanted an accessible and informative way to discuss disability hate crime and showcase the Safe Place initiative. They were also keen to engage with the young people who attended Comics Club at DCCS as well as the artists in Ink Pot Studio. Through a series of five workshops held at DCCS, the team of six Advocators worked with the young people, artists and the DCCS team to create the characters and stories for the comic. At every point of the process, the Advocators advised the team on how they would like the information to be communicated, from the language used to how they wanted to use their own experiences to create the stories. The stories were fictional but they were drawn from their own real-life experiences of hate crime. This fictional aspect gave them space to 'play the character', creating a safe space to the discuss difficult subject matter (Jindal-Snape et al. 2011) by inhabiting the world of 'the image of reality and the reality of the image' (Boal 1995: 43). This was an educational and emotional experience for the rest of the team. For example, the Advocators insisted that the abusive language that had been directed against them was used in the comic. As they explained, 'if we don't show that it is a hate crime, then people reading might not know that it is'. Under the guidance of Advocating Together, the finished comic presented six hard-hitting stories that showcased the stark reality of the hateful (and criminal) experiences they suffer on a regular basis. However, it was important that this comic was not just to be informative for readers about what constitutes a hate crime, but also present information for those who experience it to help them Keep Safe and to contact the support services or police.

The comic was launched at DCCS in December 2016 and featured in the local press. Initially, 1500 copies were printed and distributed to Dundee's Keep Safe places. It is also hosted on the Advocating Together website and has since been reprinted and distributed nationally to the learning disability/autism community, hospitals, colleges and universities, community centres and businesses. Reflecting on the process of creating a comic with a wide appeal that was not just aimed at the learning disability/autism

community, Vicky Scott, communication coordinator for Advocating Together, stressed how important it was that the comic was 'relevant and useful in highlighting what disability hate crime is, and how to report it'. In terms of the impact of the comic, she also noted how making the comic created a knowledge exchange between the Advocators and the artists, 'the experience allowed our team to get creative and allowed the young people to learn about what disability hate crime is. The experience gave our team genuine control over the finished product'. Scott reports that the comic is a resource that Advocating Together still uses, and is always part of any promotional work that they do, demonstrating that the comic has had a lasting impact on how they work and communicate with the public. For the SCCS, this comic was an important initial step in moving research on educational and public information comics from the realm of scholarship and towards a practice research methodology informed by a process of co-design. The Comics Jam was starting to gel.

Inspired by the success of *Tackling Disability Hate Crime* and the work of the Graphic Medicine research network, whose annual international conference was co-organized by the Dundee Comics team and held in the city in 2016, SCCS began to produce more comics that dealt with illness and disability (Figure 3). This has led a large portfolio of public information and educational comics, and notably *Fibromyalgia and Us* (2017), *The Gift: Transforming Lives through Organ Donation* (2018), *Close to the Heart* (2018), *Let's Talk about Suicide* (2018), *When People Die: Stories from Young People* (2019) and *Pandemic Tales: Responses to COVID-19 and Lockdown* (2020), among many others.

Fibromyalgia and Us (2017) was a project initiated by Professor Jindal-Snape (School of Education and Social Work), who has fibromyalgia and wanted to use the comics medium to inform the healthcare professionals and the public about this less-known and often-misunderstood 'invisible' condition that is characterized by chronic pain and fatigue (Figure 4). The comic opens with an autobiographical story by Jindal-Snape, with contributions by her family, and artwork by Ashling Larkin. This story highlights the impact of fibromyalgia on the individual as well as their family and

friends. Her colleague Lynn Kelly also wrote a story about her own experiences and benefits of gentle exercise, with artwork provided by Letty Wilson; and there were stories by Judith Langlands-Scott, who detailed the trauma of being misdiagnosed with fibromyalgia in a story with artwork by Zuzanna Dominiak. Judith's son, Andrew Keiller, wrote a story that was drawn by Elliot Balson. This was an important addition as the general perception is that only women, or more commonly older women, have fibromyalgia. His story detailed his struggle with fibromyalgia while at school, where teachers and classmates were rarely understanding or sympathetic. Damon Herd and Letty Wilson drew stories based on the experiences of a doctor and a physiotherapist. This comic was launched at an event that received significant attention from both local, national and international press, and a digital version of the comic was subsequently downloaded over 13,000 times. The international attention included the comic being featured on the American website The Mighty, which is dedicated to chronic disease. The stories from the comic were serialized in a magazine dedicated to fibromyalgia. The feedback was overwhelmingly positive, and several readers reported that the comic had made a substantial impact on them and on their families. The comic clearly filled a need. Here was a comic about a greatly misunderstood and often invisible condition that tackled the subject in an informed way, co-created by people who knew the condition intimately. The visualization of the condition and its effects in the medium of comics allowed readers to engage with the experience of having fibromyalgia in a way rarely seen, and it made a considerable impact. The aim was to create something not simply as a means to communicate accurate information, but which would be attractive, engaging and more powerful than a standard information pamphlet. There was a need to communicate, as far is as possible through a representation, not just the facts about fibromyalgia, but also the feeling of having this condition. This made the comic all the more impactful. As Judith Langlands-Scott, one of the writers of the comic, recalled, Seeing the finished panels had a completely unexpected effect on me. It was a moment of pure catharsis. All the years of health-related anger and holding health-related information in my head, were gone. Instead, when I saw the finished comic, I felt incredibly proud. Seeing it allowed me to offload years of baggage. My story is there in

print, I no longer need to store it in my head. It been a fascinating process. I wish everyone with a chronic illness was lucky enough to have this opportunity.

This demonstrates that the process of creating the comic with the team, as well as seeing the finished result, made a significant impact on how the contributor understood her relationship to the condition. A reader of the comic, also living with fibromyalgia, said 'it's so easy to doubt what you're experiencing, and that's the scariest part, let alone explaining it to anyone. These comics really do resonate with all invisible, misunderstood illnesses'. Another reader whose son has fibromyalgia has said that the comic should be mandatory reading for all General Practioners (GPs). The comic was endorsed by NHS Tayside and paper copies were distributed to all GP surgeries and pain clinic at the local hospital. The impact and potential of the comic as a mode of professional and public education was recognized by MP Stewart Hosie, who tabled an Early Day Motion (EDM 2135) in the House of Commons on 4 March 2019 that was signed by MPs from across the political parties. The motion read,

> That this House welcomes the creation of *Fibromyalgia and Us*, a comic published in Dundee designed to spread awareness of the symptoms, the difficulties and what works through the lived experiences of those living with Fibromyalgia, and their families; recognises the success of the comic since its launch […]; welcomes the support offered by NHS Tayside in ensuring all GP Surgeries in the region received paper copies; and wishes them the best of luck with their fundraising efforts.

Close to the Heart (2018) was created by Megan Sinclair, and completed during her Ph.D. (Figure 5). The comic focuses on the sudden loss of her father from a heart attack in 2014 and her initial response to the traumatic event. The comic initially started out as a personal project that Megan worked on as part of her master's degree, but as her research developed through her doctorate and she became more involved in the DCCS public health information campaign, the comic expanded into a wider collaborative project. The final product involved over ten artists with additional short stories from her family members. The British Heart Foundation was also contacted as part of the project and contributed informational pages, useful resources and media support throughout its development and launch. They also recognized the comic's merit and ability to raise

awareness of heart disease and nominated Megan Sinclair for their annual Heart Hero Award in 2019. Sinclair notes of the experience that the comic itself has become almost a metaphor for her bereavement,

> Although the comic is set on the day of my Dad's death, the process of making it and the additional epilogue and short comics from my family have transcended the narrative into a journey of my grief. It started out as a very isolated experience and turned into a collaborative, celebratory memorialisation of my Dad. Although the grief itself never truly fades, working with my friends and family, and opening up about my experience has been a hugely rewarding experience, it took four years to make the comic, and I truly believe the process of its creation helped me to reflect on and view my bereavement in a much more positive light.

Since its launch in November 2018 as part of a Public Information Comics Symposium held at the UoD, the comic has received a significant media response. From newspaper articles, features on grief blogs and on the British Heart Foundation social media sites to television interviews on STV, that is TV, and discussions with John Beattie and Kaye Adams on BBC Radio Scotland. The comic has proved to be an engaging, educational and communicative resource – following an interview on the Kaye Adams show, the radio station shared an edited video of Sinclair's interview on their Facebook page, leading to over 40,000 views. Sinclair has also used the comic within her teaching, where it features in the Medicine and Literature Self Selected Component module that she co-runs with Damon Herd. She has also facilitated various workshops as part of her Ph.D. research that incorporate *Close to the Heart* and other SCCS creative work as part of her teaching.

Let's Talk about Suicide (2018) was a collaborative comics project overseen by Grant King, a lecturer in mental health nursing at the UoD, and the comics creative team. The comic was developed by King's 2015 mental health nursing student cohort, who over the course of several events, worked alongside comics writers and artists to develop comics related to the theme of suicide. The students were separated into four groups and each produced a five-page comic that responded to the stigma of suicide and encouraged

readers to communicate with, and support, those in need. From superheroes to social media, each comic responded to the topic in an innovative and different way. As King notes, '[a] comic is a wonderful way to tell a story that is about people's thoughts and feelings. The images can communicate powerful messages that words alone could never do justice do'. The project was one of the first to involve nursing students and allowed them a creative way of responding to their learning and experiences.

Nabizadeh has found in her research that comics that depict traumatic events or circumstances (as our healthcare comics often do) often employ formal or stylistic elements that allows for the return of the past within the present. Comics, she argues, are particularly good at addressing traumatic memory, and depicting the co-presence of different time frames. This is especially effective in the representation of pasts whose remembrance is inherently compromised or prohibited through other forms of record in the visual archive. The depiction of traumatic memory in comics can have a powerful effect on readers, and those whose memories are being depicted. This helped us learn how to give voice and agency to those whose experience has been marginalized or oppressed, and that extends to those with misunderstood illnesses, disabilities or needs (Nabizadeh 2019). Several of the comics that we created dealt with issues of memory, and sometimes, loss and trauma. Nabizadeh was able to bring her work to bear on the creation of some of the comics, influencing how the team thought about the potential of comics to address such issues. This was particularly evident in the comic *When People Die: Stories from Young People* (2019), which was developed in conjunction with colleagues from the University of Strathclyde and funded by the Scottish Universities Insight Institute (SUII) (Figure 6). The year-long project involved a series of workshops held at HMYOI Polmont and the charities Richmond's Hope and Children's Hospices Across Scotland (CHAS). The intention was to explore how comics can help generate reflective life stories by young people who have experienced bereavement in order to provide insights and support to help other bereaved young people, and to destigmatize conversations about loss and grief. The iterative co-design process was important as we were working with young people, some of whom were still navigating through their bereavement. Building trusting relationships with adults was a key aspect of the process

(Jindal-Snape et al. 2020). The young people were involved in telling their stories not only verbally but also through their own drawings and creation of comics, and in some cases, working with comics artists to help visualize their stories. At all times, they were supported and overseen by experts in bereavement counselling. The participation in visual arts was particularly pertinent as previous research has highlighted the impact of arts participation on young people's well-being (Jindal-Snape et al. 2018). When launched, the comic not only directly connected with bereaved young people but also enabled parents, carers, teachers and peers to provide better support in the event of bereavement. This was reflected in the feedback. Janet O'Connor, who works as a social worker with CHAS and supported participants during each workshop, said, '[w]orking in partnership with young people who have experienced bereavement means the comic reflects genuine insights and has an authentic voice that will hopefully help other young people who are experiencing grief'. Upon the launch of the comic, Bruce Adamson, the Children and Young People's Commissioner for Scotland, tweeted that the comic was,

A wonderful resource about childhood bereavement. Children have a right to the best possible support and assistance when dealing with trauma and loss. This is beautifully done, and will help adults better understand. Well done everyone involved.

Pandemic Tales: Responses to COVID-19 and Lockdown (2020) was a comic designed to tell the story of how various individuals and groups have adjusted to life during the coronavirus pandemic and the widespread lockdown that resulted (Figure 7). Jindal-Snape worked with a secondary school student and artist Ashling Larkin to create a story about the transition from secondary school to life during lockdown for teenagers, many of whom lost out on the last days of secondary school, exams and other anticipated milestones; this mismatch in expectations and reality can lead to negative transition experiences for some young people (Jindal-Snape and Cantali 2019). Therefore, this comic also provides strategies to navigate these non-normative transitions. This story was downloaded nearly 1000 times within the first week of its digital launch, and prompted another tweet from Bruce Adamson, the Children and Young People's Commissioner for Scotland, who, recognizing the impact of the comic, said '[t]his is a brilliant way to communicate what so many young people are feeling right now. It's essential that we

support young people to communicate in forms that work for them – and then listen to their powerful messages'.

As part of *Pandemic Tales*, Murray and Vaughan produced a number of public health messages, mimicking those that appeared in comics in the 1970s and featuring a superhero created by Murray as part of his practice research (Figure 8). Sinclair created *Buddy Comics*, with some stories exploring lockdown from the perspective of her dog. Grant King, lecturer in mental health and project lead on the suicide awareness comic discussed above, wrote a story detailing the experience of the UoD nursing students who moved to front-line healthcare to help with the crisis. This comic presented a challenge to our developed way of working, as the co-design aspects have had to be explored through virtual means, which does not give the same experience as a Comics Jam that we were used to, but the process was resilient and the virtual Comics Jam experience preserved the essence of the methodology. That said, other challenges to the process came in another aspect of our educational and public information comics work – science communication comics.

Science communication

Comics have long been recognized as being effective in visualizing complex scientific issues (Farinella 2018: 6; Spiegel et al. 2013). However, a quite different challenge presents itself in the creation of science communication comics as opposed to healthcare comics. While an aspect of science communication is sometimes implicit, and sometimes explicit within healthcare comes, a comic that seeks to communicate scientific principles brings up different issues. This was evident in the comics we have produced in partnership with the UoD's Leverhulme Research Centre for Forensic Science led by Niamh Nic Daeid. This collaboration has resulted in *Understanding Evidence* (2016), *Understanding Forensic Gait Analysis* (2020) with *Understanding Forensic DNA Analysis* to be published in late 2020, and other titles to follow (Figure 9). These comics are based on the primers produced in collaboration between members of the judiciary, the Royal Society and the Royal Society of Edinburgh. The primers were designed to assist

the judiciary in handling scientific evidence in the courtroom and were written by leading scientists and members of the judiciary, and peer reviewed by practitioners, scientists and judges. The aim of the primers is to present clear, scientifically accurate information and to address the limitations and challenges associated with applying scientific evidence in a courtroom. The comics, produced as part of a project called 'Understanding Forensic Analysis', reinterpret the primers in order to visualize these issues and challenges for a wider audience.

Science communication comics come with their own sets of challenges and opportunities. Chief among the opportunities is the chance to make an impact upon the way the public understands complex scientific material, and in a project such as this, where the aim is to tackle a real information problem that informs how the justice system operates, the stakes are high. The comics, like the primers, are designed to confront the 'CSI effect', whereby the public has a hugely distorted sense of how forensic analysis is conducted, and the nature of the claims that it makes, given its hugely inaccurate depiction in popular culture. The techniques seen in television and film in particular come closer to science fiction than they do real scientific practice in these areas. This adversely affects not only the understanding of juries and the accused, and their families, but also the police and professionals working in courts, from lawyers to judges. The aim of the Leverhulme Research Centre for Forensic Science is to disrupt conventional thinking about forensic analysis, especially where information regarding how it works is unsound, and the comics offer a compelling aspect to this strategy. These science communication comics, therefore, have to present scientific information accurately, and more to the point, have to be able to communicate complex information in a way that is accurate and does not add to the distortion and misunderstanding that they are trying to address. However, these comics also need to present this in an engaging way, drawing on the strengths of the medium. One aspect of this is the visual nature of comics, which allows for the presentation of data in ways that may appeal to readers. Another aspect is the ability of comics to employ caricature and visual humour in order to enliven the message. The creation of Swag Man, a stereotypical criminal, allows the reader to feel some degree of involvement in the narrative through their recognition of the genre conventions at

work, while also being presented with complex scientific information. This was very successful in the *Understanding Forensic Gait Analysis* comic, but the balancing act was far more difficult in the *Understanding Forensic DNA Analysis* comic, where the nature of the science is that much more complex and difficult to visualize. Whereas the gait comic lent itself to exaggerated postures and actions, describing the nature of DNA was much harder to enliven through caricature and a playful tone. Again, the challenge faced by the project team was how to trade off informational value (accuracy and detail) against educational value (the ability of the reader to interpret and retain the knowledge being presented). An information comic can be extremely accurate and detailed, but if it does not communicate the information in a way that leads to educational outcomes (the reader actually learns something), then that comic is a failure. The safeguard is the co-design process, and testing of the material, which took place over a series of workshops, symposia and other activities where the material has been shared with stakeholders at various stages of development, and shaped by an iterative Comics Jam production process. The initial sprint, in this case, was followed by a much longer than usual process of tweaking and adjustment to ensure the message was delivered in a precise way, and the information was not distorted in the process of creating the comic. Of course, the comics are very different from the primers that inspired them, chiefly in tone, as the comics make use of humour and visual metaphor to underscore the points being made, but great care was taken to ensure that the comic fulfilled a role that was analogous, though not identical to, the judicial primers. Here the principles of co-design were vitally important, but also very difficult to fit within the context of a 'sprint' methodology. Here the process took more time, as the issues were about communicating data, not emotion and experience, and in this context, the most important thing to preserve within the Comics Jam activity was scientific accuracy. However, the end results are looking to be promising, but evaluating this will rely on a robust assessment of the impact over time.

Conclusion

One question that is sometimes posed or implied in media coverage of our public information comics is some version of 'why use comics for educational purposes?' The

persistent idea that accompanies that questions is that comics are for children and that they are detrimental to the health and intellectual development of young people, so therefore could have no intrinsic educational value. However, it is through the use of a co-design methodology that the educational power of comics can be fully unlocked. The question for comics scholars is quite different. Few would question the educational power of comics. Rather, this article argues not just for the value of a practice research methodology that brings the creation of comics into dialogue with critical questions, another relatively uncontentious claim, but for the value of the partnership-based co-design methodology that underpins our work. In each comic, we have developed the working of the co-design stage that has been vitally important because it has brought comics scholars into a close working relationship with comics artists, but also scholars in education, dentistry, medicine, nursing, law and numerous other disciplines, professionals working in charities, healthcare and other sectors, and members of the public. The educational and information comics we have produced usually combine very different specialisms and expertise, that of the comics creators and researchers on the one hand, and the partners/institutions/charities, on the other, and targeting an audience that may or may not be familiar with the topic being addressed, or with comics themselves. As argued here, these challenges have led to the development of our co-design Comics Jam methodology, informed by the underlying principles of the sprint process, embedding impactful learning for all stakeholders within the process and creating a feedback loop between research, partnership-based working and public engagement that enlivens the final output, making the comics not simply carriers of educational information, but mechanisms that prompt further discussion and learning by engaging and challenging readers to think about the issues in new ways, releasing the educational potential of the comics medium.

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